Department of Educational
and Technical Research:
Report of research and
development activities.

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AMERICAN FOUNDATION FOR THE BLIND
15 WEST 16TH STREET
NEW YORK, N.Y. 10011

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Department of Educational and Technical Resarch

Report of Research and Development Activities

Fiscal 1989

American Printing House for the Blind
1839 Frankfort Avenue
Louisville, Kentucky 40206

AMERICAN FOUNDATION FOR THE BLIND
15 WEST 16th STREET
NEW YORK, NY 10011

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The research and development program conducted by the American Printing House for the Blind (APH) during FY 1989 reflected the high priority areas identified by previous Educational Research and Development advisory committees. These included continued development of special materials for visually handicapped students/clients in the areas of: microcomputer related software and hardware, early childhood, multiply handicapped, and braille training.

A major organizational change occurred during FY 1989. APH has for many years been developing electronic devices and, more recently, those incorporating microprocessing technology. Personnel responsible for doing so have worked closely with research personnel in the Department of Educational Research. In January 1989, a change was made in which this group and the research department joined in what became the Department of Educational and Technical Research. Bob Phelps is head of the newly formed Technical Research Division. This division not only bears responsibility for the physical development of new products involving technology, but also for shepherding first runs of many new products through production.

Funding for the research program during FY 1989 has been primarily through the federal appropriation supporting the Act to Promote the Education of the Blind. Additionally, a federal grant from the Office of Special Education and Rehabilitative Services of the U.S. Office of Education has provided partial support for development of a Braille Language Program to parallel APH's Patterns series. Activities of the Technical Research Division were supported, in part, by APH.

Research and development activities have been hampered by the need for additional personnel having expertise in specific areas. These included early childhood, programming, and electrical engineering. In January 1989 Rob Meredith joined the research staff as a Programmer filling this critical need.

As always, research staff remained closely involved with services provided by APH. It has been responsible for the summer seminar program, has participated in many product support activities, and engaged in an array of typical professional activities. Of great importance is the fine cooperative spirit that exists between research and other APH personnel in various ongoing activities.

Descriptions of projects reported herein are concise summaries. They include information about purpose, staff, background, work done during FY 1989, and work anticipated for the next year. Different stages of development are indicated for different projects as should be expected in an ongoing R & D program. Generally these fall into identification of specific needs in an area, research and/or development planning, development of experimental materials, model review, evaluation, revisions, preparation for entering resulting new products(s) into APH's production process, and writing reports and articles. Consultants of various types are used at different stages and on different types of projects. Experts in specific areas are used to help identify specific needs, determine specifications for new products, and review prototypical models. Other consultants are used to assist in experimental design and analyses. Still others, such as professional curriculum developers/writers, linguists, psychologists, etc., are used where needed. The R & D program at APH is designed to be pragmatically efficient.

Early Childhood

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Visually Handicapped Infant/Toddler Curriculum: Development and Validation Project (continuing)

Purpose: To develop a personnel and parent training curriculum specific to blind and visually handicapped infants, toddlers, and multihandicapped children, functioning at a developmental level of birth through 2 years

Project staff: Sheri Moore, Project Director
Karen Poppe, Project Assistant

Background. The most recent Early Childhood Materials Needs Assessment meeting assigned a high priority to infants, including the multiply handicapped blind/visually impaired infant. The primary reason for this infant emphasis was the group's assessment of the critical nature of early intervention. It is widely acknowledged that the impact of blindness on an infant's development is documented and substantial. Numerous research studies indicate the importance of teaching parents of blind and visually handicapped children early stimulation techniques and strategies for coping with their children and their own feelings. Failure to provide a stimulating and appropriate early environment often leads to developmental lags, atrophy of the sensory systems, and to eventual developmental regression. The increasing survival of very low birthweight babies presents an array of vision related problems. Increasingly, infants with visual handicaps also have additional problems and, for these children, early intervention becomes even more important.

The need for specifically developed educational and curricular materials to assist in preventing significant developmental delays is apparent. During FY 1986 and 1987, proposals for grants were written and submitted to obtain funding for this project. None of the proposals were funded. With the growing numbers of blind and visually handicapped infants/toddlers and the advent of Public Law 99-457, the goals of this project became increasingly critical and timely.

Work during FY 1989. A third grant application was written and submitted under the federal Research in Education of the Handicapped program in November 1988. The grant proposal was titled "Infant/Toddler Curriculum Development and Validation Project." The purposes of this project, as outlined in the proposal, are (a) to develop a comprehensive curriculum concerned with early intervention for blind and visually impaired and multihandicapped infants and toddlers, birth through 2, for use with vision specialists, professionals in allied disciplines, and parents, and (b) to validate the curriculum through a series of national inservice training programs to such professionals. The project is designed to utilize expertise of both university personnel and practitioners in the development of the curriculum and the provision of inservice training. Strengths of the design are (1) that it enables the most highly qualified persons from throughout the country to participate in the areas of their expertise, and (2) that it assures national distribution of the resulting curriculum through APH, which has an interactive relationship with every state department and rehabilitation agency serving blind children and a long history of supporting personnel preparation programs in the field.

Steps in development of the curriculum are: identification of the most highly qualified persons to participate in the project, identification of critical components of existing curricula, development of detailed specifications and outlines for curricular chapters, validation of chapters through use in inservice training, and the subsequent revision and refinement of the chapters. Examples of topics to be addressed in the curriculum include Visual Training; Assessment, Intervention, and Programming of Critical Skills; Multihandicapped Visually Impaired Infants; The Impact of Visual Loss on Development; Medical Concerns; Early Orientation and Mobility Training; Methods and Materials; Working with Families; Neurodevelopmental Techniques; and so on. The validation process of inservice training will be at sites geographically distributed throughout the country. It is estimated some 500 professionals will be trained who will affect a minimum of 10 infants/toddlers each, resulting in a net impact of 5,000 children and their families.

Work planned for FY 1990. Since grant monies have not been received, the project will be reevaluated. The methods and activities for realizing project goals and objectives may need to be modified. Of the two primary goals listed below, the second goal may not be pursued if outside funding is not obtained.

1. The primary project goal is to develop a comprehensive curriculum useful to train vision specialists, professionals in allied disciplines, and parents specifically for intervening with the blind or visually handicapped child at the birth through age 2 level.

2. A secondary project goal is to provide inservice training to vision professionals and professionals in related disciplines working with blind and visually handicapped infants and toddlers, birth through age 2. This inservice training serves the project as a validation of the curriculum content.

In reviewing project options, the Educational Research and Development Committee suggested considering outside funding from a grant, in collaboration with a model demonstration program. Printing House staff will review a variety of possible directions for this curriculum development and training project.

Developing Literacy: Basic Skills, Concepts, and Early Experience (continuing)

Purpose: To provide a program and materials for teachers and parents of young visually handicapped children to assist them in providing, from birth, the experiences and interaction necessary to develop and interrelate skills for literacy

Project staff: Suzette Wright, Project Director and Coauthor
Josephine Stratton, Project Coauthor
Tom Poppe, Model and Pattern Maker

Background. Literacy, in the broad sense, refers to an individual's ability to speak, listen, read, write, and bring meaning to and get meaning from symbols. The current project focuses upon bringing meaning to and getting meaning from symbols. Development of literacy, in this sense, does not begin with a child's first exposure to school and readiness lessons; it begins at birth, as basic motor, communication, perceptual, and social skills develop and as concepts take form. Interrelationship of early skills and concepts is key to their continuing refinement and to the development of literacy. The ability to communicate, meaningfully, forms the foundation of literacy: it enables the child to bring meaning to symbols. In addition, the young child needs to develop skill in visual and hand exploration of the environment, forming a wide range of concepts and adding to the store of meaning he/she brings to symbols. It is also important the child develop skills in order to get meaning from symbols. Through exploring the environment, the child will begin to recognize naturally occurring symbols for identifying everyday objects, and will come to understand the usefulness of written symbols. Listening to and enjoying read-aloud stories is particularly important for developing the understanding that written language is a way of communicating and that it has meaning. Research shows that rich, early experiences with read-aloud books is highly correlated with a child's reading ability in later years. The need for beginning books for young children was given a high priority at a 1986 early childhood needs assessment meeting.

The current project will provide, in a print document, the framework for the development of literacy from birth and will suggest activities which may assist a visually handicapped infant or child. Storybooks, containing tactile and visual graphics appropriate for a young blind or low vision child, will be developed; suitable commercially available products will be recommended.

Work during FY 1989. The first draft of the print document for parents and teachers was completed. It consists of three parts discussing development of skills for literacy during infancy, the toddler years, and preschool years. Within each part communication, concept development, hand skills, and book experiences appropriate for the developmental period are discussed. Resource lists offer readers further sources of information. Eight braille/large type storybooks were written, illustrated, and prototypes made. Four additional stories were written and designed. In all, there are 12 books. The stories' illustrations are both tactile and visual. The tactile graphics range from real objects on the book's pages, to thermoform replicas of real objects, to raised line drawings of real objects with familiar, simple contours (a ball, popsicle, pancake). Visually, the illustrations are simple and colorful. For the stories' text, braille and large type have been interlined. The child is not expected to read the text; it is provided for exposure as the story is read to the child or as he independently explores the book's contents. Books are constructed of a variety of materials to provide durable braille and tactile illustrations and to offer color and visual interest--extra-heavy braille paper, braillon, and colored "Polyblend" plastic with silkscreened and printed graphics. Cost of the storybooks was carefully considered. The materials and production techniques chosen represent a compromise to achieve tactile/visual interest and affordability. The parent/teacher document and tactile/visual storybooks were presented to the committee formed to advise project staff throughout the project. The 7-member committee includes teachers, a parent, teacher preparation personnel who have experience with visually handicapped infants and preschoolers, and specialists in language development and reading. The committee members were favorably impressed with the parent/teacher document and storybooks. They offered suggestions for improvement and refinement; no major revisions were suggested. Their recommendations have been implemented, and sets of storybooks are being duplicated for field evaluation.

Work planned for FY 1990. Field evaluation of the parent/teacher document and 12 storybook prototypes will be conducted at six or more sites. Review of the parent/teacher materials by additional parents of young visually handicapped children will be sought. Following analysis of the results, indicated revisions of the materials will be made. Final formatting and art for the parent/teacher document will be designed.

Infant Skills Project (continuing)

Purpose: To develop a collection of tangible child-use materials targeted for infants and toddlers, birth-24 months, and to develop accompanying written material useful in developing critical skills in young children

Project staff: Sheri Moore, Project Director
Karen Poppe, Project Assistant

Background. The purpose of the recent Early Childhood Materials Needs Assessment meeting was to develop recommendations for specific early childhood educational materials research and development projects. The committee delineated and set priorities for five specific areas, with the Infant Skills project receiving a high priority rating. This high priority correlates with the emphasis at the federal level to initiate and strengthen infant/toddler programs throughout the United States under PL 99-457.

Work during FY 1989. The literature search, an important cornerstone for project development, was continued and updated. Literature surveys included areas such as child development, special education for young children, pediatric medicine, pediatric ophthalmology, family structure and development, service delivery options, physical therapy, occupational therapy, and educational programs and services. In addition, the early childhood vision annotated bibliography and agencies/services program databases, to be utilized in this project, were expanded. Commercial materials, with potential application for visually handicapped infants and toddlers, were selected, sourced, and obtained for review. In addition, preliminary specifications were developed of APH designed tangible materials for this project. A series of written materials were drafted detailing skills and activities which can be developed with the tangible educational materials. A teacher survey was also developed, querying teachers of infant visually handicapped children as to useful materials, needed educational materials, and helpful resources and references.

Work planned for FY 1990. The teacher survey data will be posted and analyzed, and used to determine final product specifications. A committee of teachers of young visually handicapped children will assist in further delineating materials specifications. All tangible materials will be sourced and collected to be used in a formative evaluation. Teachers, children, and parents to be included in the formative evaluation will be contacted. An evaluation instrument will be developed to assist in collecting evaluative data. Data from the field test will be posted and analyzed. Revisions and modifications will be made to the tangible materials in accordance with the field evaluation results.

Along with the tangible materials, a guidebook detailing suggestions, recommendations, and activities for working with visually handicapped infants will be refined and evaluated. Teachers participating in the tangible materials field test will also be requested to critique the accompanying guidebook. This guide, developed as the Parent Early Childhood Education Series by Overbrook School for the Blind, contains a great deal of excellent information in areas as:

1. General suggestions for infants with visual impairments
2. General suggestions for the multiply handicapped young child
3. Terminology
4. Developing eating skills
5. Promoting orientation and mobility skills
6. Tactile stimulation activities
7. Sensory development activities
8. Developing vision skills
9. Selecting equipment and toys
10. Developing motor skills
11. Developing fine motor skills
12. Positioning and movement
13. Cognitive development
14. Siblings and suggestions for family life
15. Developing listening skills
16. Parent-child interactions
17. Developing language and communication
18. Developing social skills
19. Reaching and grasping
20. Bilateral coordination
21. Cause and effect
22. Object permanence
23. Siblings and suggestions for family life
24. Stereotypic mannerisms, prevention and extinction

Following the evaluations of the guidebook and tangible materials, the data will be analyzed and used as a basis for revisions and modifications. Additional field testing will be conducted as needed, based on results of the initial field evaluation.

Preschool Learning Activities (continuing)

Purpose: To develop an instructional manual of learning activities appropriate for blind and visually handicapped preschoolers, ages 3-, 4-, and 5-years old

Project staff: Sheri Moore, Project Director
Karen Poppe, Project Assistant

Background. APH has begun to develop a continuum of educational materials for the 3-, 4-, 5-, and 6-year old age group. This is particularly timely, with many additional preschoolers being served through PL 99-457. This project involves a manual of varied and numerous learning activities, specifically designed to make use of common objects in the development of a continuum of sensory skills and important concepts.

Work during FY 1989. Work has progressed on the development of a manual detailing learning activities. A literature search was undertaken; relevant literature to learning patterns of young blind children was reviewed. In addition, a review was made of current preschool curricula for sighted and visually handicapped young children. An analysis was made of the concepts emphasized and the skills needed by 3-, 4-, and 5-year old children.

A local group of preschool teachers was gathered to review and enhance the learning activities already developed for the instructional manual. Activities are designed to address skills that often require a great deal of practice, such as squeezing, pouring, sorting, categorizing, classifying, sequencing, and so on. The activities make use of environmental materials such as sponges, buttons, nuts, rocks, pennies, silverware, basters, water, marbles, magnets, beads, golf tees, cotton balls, and clothespins. Special consideration is given in the manual to learning experiences beneficial to young visually handicapped children and also designed to foster integration experiences with sighted peers.

Work planned for FY 1990. The Preschool Learning Activities manual will be used by teachers working with young visually handicapped children. Following the completion of a formative evaluation, the instructional manual will be revised incorporating the recommendations of the reviewing teachers. Additional learning activities will be written and incorporated into the manual. Several sorting/ classification trays will be designed and prototypes made. These trays, along with the instructional manual, will be field-tested with visually handicapped preschoolers in the 1989-90 school year. An evaluation will be designed to obtain information from the evaluating teachers of the value, usefulness, and durability of the Preschool Learning Activities materials. These data will be compiled and will form the basis of final revisions to both the manual and the tangible component of the Preschool Learning Activities project.

Early Childhood Microcomputer Applications (continuing)

Purposes; To familiarize staff with computer software designed for young children, to assess its applicability and/or adaptability for young blind and visually handicapped children, and to develop a talking software program for young blind children

Project staff: Sheri Moore, Project Director
Microcomputer Group

Background. The increasing trend of working with young children and computers was discussed at the Fifth Microcomputer Advisory Committee meeting. Specific to young blind children, it was determined that obtaining computer literacy early was a decided and necessary advantage. The advisory group recommended that APH staff should explore the use of computers with young totally blind children and, secondly, develop a beginning concept orientation talking software program for this specific audience.

Work during FY 1989. APH staff continued to keep abreast of the increased trends in microcomputer use with young children. Resource material and literature related to this specific topic were sourced and collected. Several pieces of early childhood software with possible application for young visually handicapped children were reviewed. Also, two specialists in early childhood vision, with microcomputer experience, participated in the Fifth and Sixth Microcomputer Advisory Committee meetings.

Work planned for FY 1990. APH staff will continue to source and review literature and software related to microcomputer applications for young children. Also, reviewing and evaluating software programs for young children and young visually handicapped children will continue. While numerous commercial producers have rapidly increased their offerings of early childhood software, very little software is appropriate for the severely visually limited child. In addition, a talking software program specifically designed for young visually handicapped children will be developed. Initially, a needs meeting will be conducted with several vision professionals using computers with young blind and visually handicapped children. This meeting will assist APH staff in determining concepts to be presented in the initial APH talking software program for early childhood learners. Following this meeting, specific software specifications will be developed. Project staff will work in tandem with the programmers from the Microcomputer Group to develop a talking software program for young children. When the talking software program is finished in a "draft" format, it will be formatively evaluated by teachers using computers with young blind and visually handicapped children.

Early Childhood References and Resources (continuing)

Purpose: To research recent literature relevant to young blind and visually handicapped children and to develop a resource list of such references and resources

Project staff: Sheri Moore, Project Director
Karen Poppe, Project Assistant

Background. A selected bibliography of recent early childhood vision literature was prepared for the Printing House's 1987 Annual Meeting of ex officio trustees. At the same time, several other early childhood special education resource listings were also compiled and distributed including: professional journals, curricula, general references, and assessment tools. These resource materials have continued to generate considerable interest and requests from practitioners.

Work during FY 1989. Because of the continuing demand for these resource and reference materials, the selected bibliography of early childhood literature, specific to blind and visually handicapped children, was refined and also updated. The updated bibliography contains nearly 175 references, most being written in the past 7-8 years.

In addition, a second bibliography was researched and developed entitled Developing Visual Efficiency. This selected bibliography contains some 200 references relevant to the important topic of developing visual efficiency in low vision learners. These materials continue to be available as a service, upon request, to Printing House consumers.

Parents and Visually Impaired Infants (PAVII) (continuing)

Purpose: To provide written materials useful in developing individualized intervention programs for infants and young children with visual handicaps

Project staff:
Sheri Moore, Project Director, APH
Deborah Chen, PAVII Author
Fred Otto, Editor
Karen Poppe, Project Assistant
Suzette Wright, Project Assistant
Gail Cavello, PAVII Author
Claire Taylor Friedman, PAVII Author

Background. The PAVII materials were developed through a federally funded project of the Blind Babies Foundation in San Francisco, California. Materials developed through the 3-year project are targeted for parents, early interventionists, and special educators providing home-based services to families with visually handicapped infants. There are six print booklets comprising project materials, each with several sections.

Following discussions between the PAVII director and APH staff, APH was requested to consider publishing the project materials. All PAVII materials were subsequently reviewed and evaluated by Printing House staff. The PAVII materials were then submitted to the Educational Research and Development Committee of ex officio trustees for publication consideration. At the June 1988 meeting of the Educational Research and Development Committee, approval was given to begin the evaluation, revision, editing, and publication process of the PAVII materials.

Work during FY 1989. PAVII is composed of six major sections, each with a number of subsections. These six components are listed and briefly described as follows:

1. The Parent Assessment of Needs (PAN). An ecological inventory or interview/report form which helps parents to identify home-based goals and prioritize objectives for their infants.
2. The Parent Observation Protocol (POP). An instrument for using a video "microteaching" format in parent-training. The format encourages parent observation of self and child, as well as identifies teaching priorities and strategies for facilitating early learning experiences.
3. PAVII "How-To" Papers on Assessment. This is a series of papers for home-based assessment of infants and toddlers who are visually impaired.
4. The Art of Home Visiting. A paper which discusses roles/responsibilities and prerequisite competencies for a home visitor. It also offers practical suggestions for a home visit and issues encountered in the home visit process.

5. Getting Ready for School. A paper for parents considering preschool programs for children with visual impairments. The paper discusses the learning environment, family factors, child factors, school district factors, expert input, and educational rights.
6. Learning Together: A Socially-based Curriculum for Infants and Toddlers with Visual Impairments is a parent guide of home-based strategies for daily routines which integrate cognitive, social, communication, motor, and perceptual skills. The guide includes a brief discussion about the parent's role as "teacher," the home as a primary learning environment, and suggestions for typical routines such as meal time, bath time, bed time, play time, and going out.

All PAVII materials were extensively reviewed by four content experts. Each reviewer completed a detailed evaluation of all PAVII components as well as a general, overall evaluation. The general evaluation assessed such things as PAVII's strengths and weaknesses, potential audiences and uses of the program, the value and usefulness of the materials, specific format and organizational recommendations, appropriateness of the illustrations, and reference and resource materials that should be added to PAVII. In addition, a great deal of detailed information was obtained for each of the sections, including section strengths and weaknesses as well as suggestions for improvement.

Following the analysis of the data from the four content experts, decisions were made as to needed revisions and modifications of the PAVII materials. The entire set of PAVII materials was revised, edited and proofread; some style and format changes suggested by the reviewers were incorporated. These edited versions were mailed to the authors for approval. The approved changes were then made to each document. Arrangements were made to have the bulk of the papers formatted for production by a desktop publishing process. After each author reviewed final copy, a final proofreading for style and content was conducted.

Work planned for FY 1990. Graphic design of a cover and illustrations included in the text will be completed. A production document will be developed, detailing necessary information about PAVII. Printing House staff will work cooperatively with production personnel to assure a quality and accurate product. In addition, a final report will be written detailing overall project activities and development. Project staff will also participate in developing marketing material specific to the PAVII materials.

Classroom Calendar Project (new)

Purpose: To develop a classroom calendar with both print and braille particularly for use with preschool and primary level visually handicapped children

Project staff: Eleanor Pester, Project Director
Tom Poppe, Model and Pattern Maker

Background. During visits to both preschool and primary classrooms for the visually handicapped in May of 1988, both calendars and activities centered around them were observed. The calendar seemed to have the potential for being a useful educational tool, but required adaptation to be meaningful for both print and braille readers. Some busy teachers did not take the time to adapt a calendar, and some of the calendars which teachers had adapted were rather unattractive. The solution seemed to be to develop a print/braille calendar for classroom use.

Work during FY 1989. A market search was conducted to see calendars available for regular classroom use, and two sample calendars were obtained. Possible methods and materials for making the calendar were explored and a list of possible symbols was compiled. A prototype was developed and a planning document and time line were written. The project was presented to an in-house committee and discussed. Following the in-house committee meeting, questionnaires were developed and sent to nine reviewers. When all nine questionnaires were returned, data were analyzed and objectives and suggested activities were compiled. Based on this information, recommendations were made for the production of (1) a classroom calendar similar to the prototype which had been developed, (2) individual monthly calendars with number print/braille stickers, and (3) minor revisions in the present APH braille calendar. A report was written and distributed to the in-house committee for comment before proceeding.

Work planned for FY 1990. Prototypes of the calendars will be produced and sent out for evaluation. Data from the evaluations will be analyzed and the calendars will be revised as needed before they are turned over to production.

Multihandicapped

Multihandicapped Adolescent Project (continuing)

Purposes: To develop a manual of community-based learning activities designed to meet the needs of adolescent multihandicapped visually impaired students, and to develop and evaluate several tangible materials useful in fostering independent functioning in adolescent multihandicapped students

Project staff: Sheri Moore, Project Director

Background. The Multihandicapped Adolescent Project is targeted for students who have achieved basic skill levels and are involved in an educational program emphasizing self-care, independence, and life/community living skills. Written activities include age-appropriate and environmental applications stressing skills useful in a community-based living option.

Work during FY 1989. The formative evaluation process was designed and arrangements were made with cooperating teachers. The manual of community-based learning activities, stressing practical and experimental life skills, was prepared for draft form. Examples of the content areas include:

1. Grocery shopping
2. Shopping in a discount store
3. Shopping in a department store
4. Shopping for clothes
5. Accessing and using public transportation
6. Using school or personal transportation
7. Using the telephone
8. Using a laundromat
9. Eating in a fast food restaurant
10. Eating in a sit-down restaurant
11. Going to a barber shop/beautician
12. Using the library
13. Operating vending machines

All activities are being written at a basic level. They are designed to be used by staff inexperienced in working with the targeted group or paraprofessionals. An additional emphasis is on the use and development of the sensory processes in the acquisition of skills in the content areas presented. Regardless of category, all activities include environmental applications stressing the importance of developing independence, self-sufficiency, and community living/life skills.

Project staff conducted a continuing literature search to familiarize themselves with current, related material in the area of community based instruction. Journal articles, media, curriculums, and books pertaining to sensory training, age-appropriate materials, the multihandicapped adolescent, daily living skills, community living skills, self-help skills, life skills, survival skills, group home living skills, and transition were perused.

Work planned for FY 1990. The formative field evaluators have requested an extension of the material presented in the manual of community-based learning activities, because so little is available in this content area. Consideration will be given to extending activities in the manual to include a domestic skill cluster, a personal skill cluster, and a recreation/leisure cluster of learning activities. Literature in these areas will be surveyed, as well as commercial materials available in these content areas. Teachers of multihandicapped visually impaired students will participate in the writing of these additional content areas. Another group of such teachers will be selected for a field evaluation of the revised materials. Following this, necessary modifications and revisions will be made prior to the initiation of production process.

Task Oriented Inventory and Work Skills Program (continuing)

Purpose: To provide a program that will assess and include work skills activities for a process approach toward task oriented behavior with objects

Project staff: Bill Duckworth, Project Director
Suzette Wright, Project Assistant
Gretchen Stone, Project Author

Background. The Austin Work Skills Evaluation, from the Texas School for the Blind, was found to offer a great deal of excellent material for programming with young visually handicapped students with developmental delays as well as the moderately to severely multihandicapped student. In working with the author, however, it was found that many of the ideas could be expanded and the program could include information for various populations of visually handicapped students. The program developed to be more nearly a process of concept development for the limited student or the student with limited experiences than it was a program that led directly to vocational training. With the wide functioning range of the population needing prevocational training, it was deemed appropriate to expand the program for broader application. The program remains, however, a process of handling materials in a way leading to task-oriented behavior and to the development of work-related concepts which will serve as a basis for more specific training.

Work during FY 1989. Drafts of all sections, with the exception of the Introduction, were reviewed by the project's advisory committee. Due to the many suggestions made, major changes in format and content were undertaken. Gretchen Stone and Beth Langley, a member of the committee, worked on this revision.

Work planned for FY 1990. The revised draft of the program is expected to be completed by the end of July 1989. Following a final review of the program materials by the advisory committee, the program will be evaluated by teachers in the field using it with their students.

Low Vision

Potential for Visual Efficiency Assessment (formerly titled Assessment of Visual Potential Instrument) (continuing)

Purpose: To develop an assessment instrument useful in evaluating the potential for visual efficiency of young children with multiple impairments, in addition to a visual handicap

Project staff: Sheri Moore, Project Codirector
M. Beth Langley, Project Author

Background. M. Beth Langley, author of the Functional Vision Inventory, has developed an instrument specifically designed to measure visual potential for visual efficiency in visually impaired multiply handicapped children. This instrument, entitled Potential for Visual Efficiency Assessment, contains seven major sections outlined as follows:

I. Demographics
II. Physical readiness
    A. Medication
    B. Time of assessment
    C. Seizure activity during assessment
    D. Reaction to handling
    E. Posture and movement components
III. Vision structure and function
    A. Structural status
    B. Orientation and mobility
    C. Functional use
    D. Physiological status
IV. Visual behaviors
    A. Gaze
    B. Eye movements
    C. Visual fields
    D. Cortical visual impairments status
    E. Acuity
V. Levels of stimuli and responses
    A. Stimuli processed
    B. Response patterns
VI. Visual perception
VII. Summary and impressions
    A. Current level of visual functioning
    B. Visual variables
    C. Skills to be developed and/or refined

Work during FY 1989. An array of literature in several disciplines was sourced, surveyed, and integrated into the Potential for Visual Efficiency Assessment. Journal articles were read and incorporated in disciplines including developmental medicine, child neurology, ophthalmology, pediatrics, brain research, pediatric ophthalmology, physiological psychology, psychology, low vision, developmental disabilities, and child development. In addition, a number of refinements were made to the instrument, such as additional evaluation sections and a more convenient format for the evaluator.

Work planned for FY 1990. A schedule and time line will be developed cooperatively with Printing House staff and Beth Langley. This schedule will detail remaining project activities. The Potential Assessment of Visual Efficiency instrument will be field-tested by a number of professionals in a variety of disciplines related to multihandicapped visually impaired learners. Revisions will be made to the instrument following the field evaluation procedure. Tangible materials may be added, depending on results of the field evaluation, and the needs of vision professionals evaluating the instrument.

Braille

Read Again: A Braille Program for Adventitiously Blinded Print Readers (formerly entitled Read Again: A Program for Adventitiously [Recently] Blinded Persons) (continuing)

Purpose: To develop a set of materials designed to teach braille to persons who lose their vision after initially learning to read print

Project staff:
Hilda Caton, Project Director
Eleanor Pester, Assistant Director
Eddy Jo Bradley, Directing Editor
Fred Otto, Assistant Editor
Karen Poppe, Project Assistant

Background. A complete set of materials was designed to teach braille reading to persons who lose their vision after initially learning to read print. This set of materials was reviewed by the project's consulting committee. Pending revisions, the program was approved for production by APH's Publications Committee. Revisions of two of the beginning levels introducing braille letters, numbers, and basic punctuation were made and the levels were again reviewed by the committee. Following this meeting, these levels were once again revised to reflect the committee's suggestions, completing work on the part of the program dealing with Grade 1 Braille. Then the part of the program dealing with Grade 2 Braille was revised and new reading applications were selected, copyright permissions were secured, and some readiness materials of special relevance to the target population were written. The entire program was copyedited and content problems were cited. The research staff met together, reviewed the entire program, and made decisions about the problems that had been cited. Following this meeting, further copyediting was done based on decisions the group had made. Additional practice materials available from APH were referenced. Detailed specifications were written for brailling and one copy was marked up for recording. Levels A and B were marked up for typesetting.

Early in the project a survey of 200 adventitiously blind people learning braille was made to provide information for the development of the materials. An article describing the survey was written, submitted for publication, and rejected. A revised article on the survey of the adventitiously blind was submitted to another journal for publication consideration.

Work during FY 1989. Level A was brailled on plates and the decision was made to wait until the typesetting was completed before continuing with the brailling and the recording. All levels of Read Again were marked up for typesetting by Eddy Jo Bradley. The research staff worked with the typesetter to produce satisfactory galleys. The galleys for all the levels were dummied up, artwork was added, and front matter was completed. Proof copies of the entire program were returned from the typesetters and checked and double checked by the research staff. Final revisions were made. All of this preparation for production took longer than has been anticipated.

The article on the survey of the adventitiously blind was returned once again with suggestions for additions and a request that the revised article be resubmitted for publication consideration. The article was revised and resubmitted.

Some progress was made on an article on the sequencing of the presentation of the braille code for adults. This included developing a tentative outline and a coding system suitable for publication and updating and adding to the information which had already been compiled. Because of the time spent on revising the article on the adventitiously blind survey, work on this article was not completed.

Work planned for FY 1990. It is anticipated that as brailling and recording for this program get into full swing, the research staff will be working closely with the production staff. The final report for the project and the article on the sequencing of the presentation of the braille code for adults will be written.

Braille Language Program (continuing)

Purpose: To develop a set of beginning language materials consisting of two components, spelling and English, which will minimize problems in these curricular areas commonly encountered by beginning braille students

Project staff: Hilda Caton, Project Director
Eleanor Pester, Assistant Director
Karen Poppe, Research Assistant
Eddy Jo Bradley, Directing Editor
Eric Hamp, Linguist

Background. This project is partially funded under a grant awarded to the APH by the Federal Research in Education of the Handicapped Program's Field Initiated Research competition which is administered by the Special Education Programs, Office of Special Education and Rehabilitative Services, US Department of Education. The resulting product has been approved for production.

Work began on the project in January 1984. Information on achievement in language, spelling, and word study skills was obtained through administration of a special braille edition of the Stanford Achievement Test, Intermediate I, Form E by teachers to 57 blind 4th and 5th grade students to identify specific problems blind students have. Analyses were made of current spelling and English textbooks and of *Patterns: The Primary Braille Reading Program*. This information was used to develop the program.

The program will consist of four levels, Levels A, B, C, and D. The first two levels of the program, Levels A and B, were drafted, reviewed, revised, and sent to pilot test sites for evaluation. The consulting committee met and reviewed the materials on each level. Further revisions were made based on these evaluations. Then the materials were placed with over 50 students and approximately 20 teachers at field test sites across the country. Annual visits were made to the sites to explain the field evaluation procedures, check on progress, and observe the materials in use. Criterion referenced tests were administered as the children completed each level. Test results were sent to APH for scoring and analysis. A similar procedure will be followed with each of the succeeding levels.

Work during FY 1989. Level C materials were prepared and sent to field test sites for use with students as they were ready for them. Field test sites were visited. Level D materials were planned and drafted.

Work planned for FY 1990. Field testing of the materials will continue. Level D materials will be prepared for field testing. Materials will be sent to the field test sites as students are ready. Final revisions of the Level A materials based on the field evaluations will be made in preparation for production. Federal support for the project will cease December 31, 1989, at the end of the project's 5th year.

AMERICAN FOUNDATION FOR THE BLIND
15 WEST 16th STREET
NEW YORK, NY 10011

Grade 2 Braille Cards (continuing)

Purpose: To develop a set of cards with Grade 2 Braille units on one side and the Grade 2 Braille equivalent on the other side to be used with adventitiously blinded teenagers and adults who are learning braille or with younger braille readers who have been introduced to braille but need identification or spelling practice

Project staff: Eleanor Pester, Project Director

Background. This product was first conceived in 1987 when plans were underway to expand the Dolch Word Cards. Teachers of braille from both schools and rehabilitation centers who were questioned felt that such cards would be useful for their students. Grade 2 Braille Cards were approved for production at the annual meeting in October of 1987. No further research on this product was anticipated since the braille units themselves were set and a similar format to that for the Expanded Dolch Word Cards would be used. Work on this product was expected to begin soon after work on the Expanded Dolch Word Cards was completed.

Work during FY 1989. When specifications for production of the Grade 2 Braille Cards were being written, questions arose concerning what to include to make this product the most useful. It seemed best to get input from braille teachers to determine the final specifications for this product. A brief questionnaire was developed and sent to nine braille teachers with experience working with the target population. Information from the seven completed questionnaires was used to write the final specifications for this product.

Work planned for FY 1990. This project is complete. Research staff will oversee the first production run of the product.

Braille Spacing and Size for Beginning Adult Readers (continuing)

Purpose: To determine the optimum spacing and size for initial presentation of braille to beginning adult readers

Project staff: Eleanor Pester, Project Director
Karen Poppe, Project Assistant
Joe Petrosko, Design and Evaluation Specialist

Background. Although little is known about the effects of spacing and size on the introduction of braille to adults, indications are that both play important roles in braille code recognition. Nolan and Kederis (1969) found that recognition of characters by 36 skilled braille readers in grades 4 through 12 was significantly influenced by the distance between dots and their location within the cell. Books for young beginning braille readers are generally double-spaced (interlined) in accordance with the standards for braille books. Milback (1954) and Hoffman and Cook (1970) suggest double-spacing both between lines and between words to aid young braille readers in discrimination. In a study done by Newman (1984) with 80 sighted male subjects, learning was facilitated by using large braille cells. Both braillewriters and slates and styluses are available for producing enlarged braille either with an enlarged dot or with a standard sized dot in an enlarged matrix. At least one braille program for adults, Braille Series, 1960, provides enlarged braille practice materials in three sizes--very much enlarged, moderately enlarged, and slightly enlarged braille. Some rehabilitation counselors feel they have better results when braille is presented initially to adults with more than the usual space around the braille characters, and some feel that enlarged braille is especially useful for teaching braille to people with decreased tactual perception. Others feel enlarged braille should not be used. Research is needed to determine optimum spacing and size for initial presentation of braille to beginning blind adult readers.

A study was designed which compared the performance of 40 blind adults who knew little or no braille on a randomly ordered series of tasks which presented braille characters in standard and enlarged braille with one, two, and three spaces between characters and with one or two line-skips between braille lines. The data were analyzed and results showed that regardless of the size of braille used, the space between characters, or the skips between lines, subjects got about the same number of items correct. Enlarged braille took subjects a longer time to read than standard size braille. The 11 diabetic subjects performed about the same as the nondiabetics, both on number of items correct and speed of performance. In contrast, the 6 subjects who were more than 70-years old got significantly fewer items correct than younger persons. These results were applied to Read Again which will be produced in standard braille only. Additional analyses of the data were done to clarify some points mentioned in the study.

Work during FY 1989. The final report was written. An article will be taken from this report and submitted for publication.

Braille Line Length Study (continuing)

Purpose: To compare reading speed and accuracy under three conditions--(1) paper with 40 cell lines, (2) paper with 20 cell lines, and (3) VersaBraille with 20 cell lines

Project staff: Eleanor Pester, Project Director
Joe Petrosko, Design and Evaluation Specialist
Karen Poppe, Project Assistant

Background. With the advent of paperless braille devices such as VersaBraille, the question of the optimum length for a braille display has arisen. At the present time, cost is a prohibiting factor, limiting the length of the display line. However, if a longer line was found to be sufficiently superior to the 20 cell line in general use, the increased cost might be justified. As APH plans for a braille display with its APH PocketBraille, and as technology and cost become less limiting factors, line length becomes an important question. Surprisingly, to date a review of the literature has turned up no research on this question.

Work during FY 1989. A study comparing reading speed and accuracy of experienced adult VersaBraille users under the three conditions described in the purpose has been designed. Three passages of approximately 500 words each and of comparable difficulty and interest have been selected for this rate study. The Cloze Technique, how it relates to visually handicapped persons using braille, and the variation used in the reading rate test where subjects are asked to identify words that do not belong as they read were investigated and applied to the test material for a broad check of comprehension.

Before the test materials could be prepared, it was necessary to conduct a survey to determine whether the participants use the older VersaBrailles which use cassettes or the newer ones which use disks and whether participants are familiar with the IRS code or with the newer BANA code. Telesensory Systems, Inc. has furnished a list of VersaBraille users who are being surveyed and from which the subjects for this study will be selected.

Work planned for FY 1990. Data from the survey will be analyzed and test materials will be prepared. Arrangements will be made for testing, and data will be collected and analyzed. A final report and an article will be written.

Linguist Analysis of American Literary Braille, Grade 2 (continuing)

Purpose: To conduct a thorough and systematic linguist analysis of American Literary Braille, Grade 2, which will incorporate the new braille terms developed for Patterns: The Primary Braille Reading Program

Project staff: Hilda Caton, Project Director
Eric Hamp, Linguist
Karen Poppe, Project Assistant
John Siems, Data Analyst and Computer Programmer, APH

Background. At the present time, no systematic analysis of American Literary Braille has been conducted. The British have completed a major contraction study of their system which includes frequency of occurrence of contractions in written text. That study, however, did not consider a grouping of braille configurations (contractions) which was different from the grouping now in use. The study proposed for American Literary Braille would use the new terms (groupings) used in the braille reading and language programs developed at APH for an analysis somewhat similar to the British study. This study would include the following steps:

1. Selection of appropriate text materials for the analysis
2. Marking (or bracketing) of the braille configurations defined in Patterns: The Primary Braille Reading Program
3. Counts of the frequency and order of occurrence of those elements in the text materials
4. Revision of the order and groupings of braille rules in the publication English Braille: American Edition with an emphasis on more effective orders and groups for teaching purposes
5. Publication of various types of materials to assist in the teaching and learning of braille

Work during FY 1989. The text materials used for the analysis were chosen. They will consist of the corpus which forms the basis of the publication, Computational Analysis of Present-Day American English (Kucera, H., & Francis, W. N., 1967), generally known as the "Brown Corpus." This publication contains 1,014 words and consists of 500 samples each of about 2,000 words, taken from contemporary publications in American English. In addition to the "Brown Corpus," selections from current issues of the Readers Digest, which have been translated into braille, will be used.

The Brown Corpus Computer tape has been obtained and a printout of a current set of articles from the Readers Digest (from the APH translation program). The following marking (bracketing) and counting of braille units has been done:

1. A line by line marking and counting of all braille units
2. A marking and counting of all contractions, composition signs, punctuation, and numbers (alphabetic and numeric)

3. A marking and counting of all whole word signs which are sometimes contracted, but are not contracted under specified circumstances (i.e., they occur at the end of a line, near punctuation, etc.).

Work planned for FY 1990. The marking and counting of various types of occurrences of the braille units will continue (i.e., the frequency with which one braille unit precedes another). An analysis will be made of the counting of braille units which was completed in 1989. A report will be written describing the completed part of the analysis and its implications for the braille code and the teaching and learning of the code.

Braille Writing Program (new)

Purpose: To develop an instructional braille writing program with both slate and stylus and braillewriter components

Project staff: Hilda Caton, Project Codirector
Eleanor Pester, Project Codirector
Eddy Jo Bradley, Materials Developer
Betty Wommack, Materials Developer

Background. To provide a truly comprehensive program in braille instruction, it is necessary to teach braille writing as well as reading. With no formal programs available, braille writing instruction was dependent on the individual teacher. A survey done by Lowenfeld, Abel, and Hatlen (1969) reported that braille writing was usually introduced to children at the same time as braille reading and that the braillewriter was usually used to teach braille writing. No other research is available on braille writing instruction. However, cases cited in current literature indicate that instruction for children in the use of the slate and stylus has been neglected.

From the time when planning for Patterns: The Primary Braille Reading Program and Read Again: A Braille Program for Adventitiously Blinded Print Readers began, the need for more formal braille writing instruction was recognized. An introduction to the use of the braillewriter was written as part of the Braille Language Program, and during the past few years several slate and stylus programs have been developed. A review of these programs showed that the program by Betty Wommack most closely corresponds to the philosophy of slate and stylus instruction which has been developed at APH. This slate and stylus program could be used in conjunction with the braillewriter material already written to produce a comprehensive braille writing program. Betty Wommack has been contacted and is willing to work with APH on this project.

Work planned for FY 1990. The people involved in this project will meet to determine the specifications. A draft copy of the program will be developed and copies will be prepared for review. The data from the reviews will be analyzed and revisions made as necessary before turning it over to production.

New Programmed Instruction in Braille (new)

Purpose: To review a new edition of Programmed Instruction in Braille (Ashcroft & Henderson, 1963) and prepare it for production by the American Printing House for the Blind

Project staff:
Hilda Caton, Project Director
Eleanor Pester, Assistant Director
LaRhea Sanford, Project Coauthor
Sam Ashcroft, Project Coauthor

Background. The original publication of Programmed Instruction in Braille (Ashcroft & Henderson, 1963) was widely used in teacher preparation programs throughout the United States. The publication of the book was discontinued because the publisher went out of business. Since then, there has not been a textbook which was totally adequate for the instruction of future teachers (or others) in learning the literary braille code. However, Programmed Instruction in Braille has now been revised and is being reviewed and considered for publication by the American Printing House for the Blind.

Work during FY 1989. Work during this period consisted of the updating and rewriting of the book by Samuel Ashcroft and LaRhea Sanford. A meeting was held at the American Printing House for the Blind to discuss the procedures and considerations for publication by APH.

Work planned for FY 1990. During this period, the revised version of New Programmed Instruction in Braille will be sent out for review by persons in the field who are knowledgeable about the literary braille code and about instructing others in learning it. The project staff at the American Printing House for the Blind will also review it. Following this, the reviews will be summarized and decisions regarding production by APH will be made.

Educational Measures

Brigance Diagnostic Inventory of Early Development (yellow) (continuing)

Purpose: To provide a tactile supplement to this Inventory for blind children ages infancy through 7

Project staff: Bill Duckworth, Project Director
Josephine Stratton, Research Intern (formerly)

Background. This Inventory is being revised by its publisher. A new edition is expected in 1989. The publisher has said most of the competencies will remain in the same order with much of the material remaining intact.

The adaptation of format has been done on the current edition. All activities have been assigned a label as to what steps the teacher will take in assessment such as using the supplement, using the print edition with modification, etc. One section, General Knowledge and Comprehension, was completed and evaluated to determine if the format was appropriate. However, a decision was made to put the project on hold until the new edition is released in order that the supplement from APH be for use with the newer edition. The Inventory was approved for production by APH's Publications Committee.

Work during FY 1989. Waiting for the revision to take place, Curriculum Associates notified APH that the plans to revise this inventory have been delayed.

Work planned for FY 1990. Adaptation will be completed when the revision is published.

Computer Administration of Academic Measures (continuing)

Purpose: To investigate the possibilities of using microcomputers to administer academic measures

Project staff: Bill Duckworth, Project Director

Background. For ease of administration, scoring, and record keeping, it seems quite plausible that some types of academic tests could be placed on computer disks for use by students who use braille and large type. The braille user would use the voice synthesizer along with braille and graphics where needed. Problems of doing this for the large type user have yet to be identified other than the need to change the format for placement of large type on the screen. Tests presently offered on computer were examined. Most were found to be not academic, but personality, occupational preference, etc.

Testwriter from Micro Media Publishing was found to have all the components that were felt to be important in administering an academic test on a computer. Test items from the Stanford Achievement Series were placed on the disk. The administration allowed a review of a question but changing mode was complicated. It also allowed storage of the students incorrect answers on the disk. Many markings which are used in pencil and paper tests and in braille tests had to be changed to be read on the screen. This is especially true for large type users. Several adults took the test and it was found that the test was a greater indicator of the person's expertise with a computer/synthesizer than it was of the knowledge of the material being tested.

Work during FY 1989. No further activity has taken place on this project.

Work planned for FY 1990. One subtest of the Stanford Achievement Series (8) will be tried with several high school students where computers are used in a manner to verify familiarity. If the speech component does not give problems with these students, then a study will be developed that will compare the results of a limited number of students taking one form of the subtest on the computer and the other form with paper and pencil.

Stanford Achievement Test, Form J of Series 8 (continuing)

Purpose: To adapt into braille and large type one form of the latest edition of the nation's most widely used achievement series

Project staff: Bill Duckworth, Project Director

Background. Continued contact with The Psychological Corporation, the publisher of the Stanford Achievement Series, obtained for APH the opportunity to be involved in the planning stages of the Stanford Achievement Test, Series 8. The series looks promising in that APH has had input into the item selection. Additionally, The Psychological Corporation has volunteered to renorm any subtest from which it is necessary to omit items in the braille edition. This edition is unique in that each level of the test is for one grade level only. The levels to be modified begin with 2.5 to 3.5. This presents APH with the possibility of offering only one form of the test. Psychological Corporation sent APH the item pool for the Stanford Achievement Test, Series 8. All test items that would pose a problem for the braille edition were flagged. Whenever possible, The Psychological Corporation avoided using these items in the final item selection for the series. This process seems to have been effective. In the Primary 2 level of Form J, only one subtest (Environment) had to be dropped and 6 questions from another of the subtests. This is in comparison to two entire subtests and 12 questions dropped from the braille edition of this level in Series 7. From J (Series 8) was approved for production by APH's Educational Research and Development Committee.

Work during FY 1989. Ten levels of Form J of the Stanford, Series 8, were adapted into braille with eight accompanying sets of Directions for Administering. Input for the braille tests has been completed. The Psychological Corporation will furnish film for use in printing the large type tests in 18-point type. This has not been done and the manuals cannot be completed until the tests are formatted.

Work planned for FY 1990. Final drafts for the Directions for Administering the Large Type editions will be completed and submitted for publication by APH. A report describing the adaptation of this series will be prepared.

Microcomputer Applications

Process and Information Dissemination

Sixth Microcomputer Advisory Committee Meeting (series)

Purpose: (1) To identify and prioritize needs for educational materials to support use of microcomputers
(2) To discuss and make recommendations regarding important technology-related considerations

Project staff: Debbie Willis, Project Director
Larry Skutchan, Project Assistant

Background. An advisory group was formed in 1984 to provide specific information and guidance on a continuing basis in the area of technological needs and applications. Five microcomputer needs meetings were held with the advisory group at APH. They were in August 1984, March 1985, October 1985, September 1986, and September 1987.

Work during FY 1989. The Sixth Microcomputer Advisory Meeting was held September 19-20, 1988. The greatest needs (not in order of priorities) identified at this meeting were:

Apple(R) products

1. Develop Talking Literacy Kit (TALK) for Apple II computers.
2. Develop Screen Door for Apple II computers.
3. Make Teacher's Pet available.
4. Adapt MECC's Food Facts.
5. Adapt MECC's Elementary Vol. 5 - Prefixes.
6. Adapt MECC's Social Studies Vol. 1.
7. Adapt KIDS CAN! TYPER (Talking Typer).
8. Make all 33 selected SEI programs available.
9. Continue to adapt MECC software and/or any other software deemed important for visually handicapped persons. (Accept recommendations from the field regarding specific selections to adapt.)
10. Develop materials to introduce students and teachers to telecommunications.
11. Develop a talking software program for young blind children that would be usable by both totally blind and partially sighted students.
12. Adapt Number Cruncher (APH Scientific Calculator: for Apple II Computers).
13. Adapt Apple's DOS User's Disk (Talking Utilities for DOS 3.3).
14. Write a supplement of 10-15 simple programs that can be used by visually handicapped persons in a computer literacy class. (This recommendation replaces the recommendation made by the Fifth Microcomputer Advisory Committee to make an adapted version of Sunburst's BASIC programming series available.)
15. Make the Apple IIGS Owner's Guide available on 3 1/2" disk.
16. Make the Appleworks Tutorial (manual) available on disk.
17. Make the Appleworks Reference Manual available on disk.

18. Enable software for the Apple IIGS:
    (a) Write a TEXTALKER GS program; and
    (b) Develop a SCREEN ENLARGEMENT program for the GS.
19. Continue with the development of the APH PocketBraille:
    (a) miniaturization;
    (b) file structure;
    (c) editor;
    (d) reorganize the manual;
    (e) pursue a braille display;
    (f) pursue software enhancements (e.g., calculator/stopwatch).

IBM(R) products

1. Develop Speaqualizer II for PS/2 series.
2. Develop Screen Door for IBM.
3. Continue with the development of the APH PocketBraille.

The Microcomputer Advisory Committee was extremely complimentary of the work that had been done; the products that have been adapted and developed, the services that have been provided, the surveys that have been conducted, etc. The committee members could not emphasize enough, however, the need for more products in this area and a timely delivery of the materials.

Work planned for FY 1990. A seventh meeting of the Microcomputer Advisory Committee will be conducted in September of 1989 to review progress, share information, discuss current priorities, project future activities, and reprioritize the needs in this area. A special meeting of early childhood needs with regard to computer use will also be conducted in the fall of 1989 since this is a new area of endeavor.

Survey of Products Being Used and Products in Need of Development for Legally Blind Persons Using Microcomputers (continuing)

Purpose: To determine the greatest needs of the field and set priorities appropriately by gathering information on the current "state of the art" of microcomputers, potential applications of technology, and developmental needs in the area of microcomputers for visually handicapped persons

Project staff: Debbie Willis, Project Director
Cathy Talbott, Project Assistant

Background. When APH became interested in developing microcomputer related products in the summer of 1983, it was necessary to determine the greatest needs of the field and set priorities appropriately. Information regarding the "state of the art" of microcomputers, potential applications of technology, and developmental needs in the area of microcomputers for visually handicapped persons was gathered during the fall and winter of that year. Recognizing, however, that this is a rapidly changing field, a second survey was conducted in the winter and spring of 1986. These two surveys provided valuable information for planning and decision-making purposes.

Work during FY 1989. In order to keep current, a third survey was planned. The October '88 issue of Electronic Learning, however, included the results of "Educational Computing In America: 8th Annual Survey of the States, 1988." Electronic Learning had surveyed the states in six educational technology areas: computer literacy; teacher certification and training; trends, issues, and concerns; state-wide technology efforts; state profile; and equipment, including hardware/software policies, and additional technology. The survey also revealed that 75% of the states intended to begin new technology-related programs in 1988-89. Heading the list were programs related to distance learning projects, and projects involving such emerging technologies as CD-ROM, videodisc, and laserdisc. This survey and other literature provided the direction needed. It was decided that a third survey was not necessary at this time, and if general information like this continues to be available, APH will only need to concern itself with specific questions regarding the visually handicapped population.

Work planned for FY 1990. Trends and changes in the computer industry and in education will be monitored through reviewing literature and attending conferences. Another survey is not planned at this time. Brief surveys on specific questions will be proposed as the need arises.

Observation and Information Dissemination (continuing)

Purpose: To gain insight into user problems by observing students at the computer and to disseminate information on current uses of technological aids through workshops, presentations, and other means

Project staff: Microcomputer Group

Background. The Fourth Microcomputer Advisory Committee recommended the microcomputer group help disseminate information about relevant technology to the field. Additionally, the meeting of the interim committee in May 1985 resulted in a strong recommendation that the microcomputer group observe students using APH computer products. To this end, the microcomputer group conducted the summer workshops in June 1986, presented microcomputer materials at several conferences, and observed students on a weekly basis at the Kentucky School for the Blind.

Work during FY 1989. The microcomputer group continued presenting and demonstrating APH microcomputer materials at relevant conferences. In addition, at least one member of the group observed, on a weekly basis, students of all ages using a variety of software. Interested users that visited APH also receive detailed product demonstrations upon request.

Furthermore, an annotated bibliography on technology-related topics from 1980-88 for visually handicapped persons was compiled. The bibliography was made available free of charge on 5 1/4" disks formatted for Apple II computers. APH's text file reading program was included on the disk so that the information could be accessed quickly and easily.

Work planned for FY 1990. The microcomputer group plans to continue with presentations and demonstrations of APH's computer-related products and the observation of computer users of all ages whenever possible. The bibliography will be updated and made available again during this fiscal year.

Product Evaluation (continuing)

Purpose: To evaluate user satisfaction with APH microcomputer products, to monitor and improve project planning and management, and to continue the identification of users of APH microcomputer materials

Project staff: Debbie Willis, Project Director
Cathy Talbott, Project Assistant
Karen Poppe, Project Assistant

Background. From the first software product published by APH, all microcomputer materials have included a self-addressed, postage-paid "User Survey Card" which asked for information which would identify the consumer, product, setting in which the product is used, strong and weak points of the product, suggestions for improvement, current equipment accessible to the user, number of users and their age/grade range, and additional comments. As an assessment instrument for evaluation, these cards provide a valuable source of information which aid in the decision-making process of the staff involved with improving existing products, determining future needs and projects, and monitoring trends in these categories. These cards also serve as a vehicle for identifying users of APH microcomputer material which is useful in finding reviewers of products and potential participants in microcomputer advisory meetings. Results of the entered data were reported at the Fifth Microcomputer Advisory Committee Meeting. Consumers' names and addresses have been entered in a separate database to receive copies of the Micro Materials Update.

Work during FY 1989. Complete information from all the user survey cards was entered into a database. Results of the entered data were compiled and reported at the Sixth Microcomputer Advisory Committee Meeting. Names and addresses of new consumers continued to be entered in the database of those who are to receive copies of the Micro Materials Update.

The User Survey Card was slightly changed. Since it is in print only, a braille notice regarding the User Survey and Warranty cards was developed to be inserted in future microcomputer products.

Work planned for FY 1990. The information from the User Survey Cards will continue to be entered into a database. The data will be analyzed periodically to study trends, revise current products, and assist in future planning. Names and addresses of new consumers will continue to be entered in the database used as a mailing list for the Micro Materials Update.

Information Dissemination: Micro Materials Update--newsletter (continuing)

Purpose: To provide a description of completed, ongoing, and planned APH microcomputer materials development projects to serve as a (a) newsletter for professionals in the field, (b) convenient means of responding to requests for more information, and (c) handout to distribute at appropriate presentations/workshops/exhibits

Project staff: Microcomputer Group

Background. The first Micro Materials Update was generated specifically for the purpose of serving as a handout for a teacher inservice presentation made by APH staff in November 1985. The same year the Microcomputer Advisory Committee recommended adding a column that would include information, in this field, that was being pursued outside of APH. The title of the column became known as "News, Views, and Muse."

Responsibility for the Update was divided between research and marketing staffs. Research was responsible for the content of the newsletter, maintaining the database of addresses, and for providing an address label printout for mailing. The newsletter was made available in braille and print forms.

The mailing list continues to grow, giving APH valuable resource of persons who are buying and using APH software and related products. In its latest issue, Summer 1989, 4,400 copies were necessary to keep pace with request for more information.

Work during FY 1989. The Micro Materials Update was updated and disseminated in print and braille twice during FY 1989. Both research and marketing contributed articles. The database of readers continued to be maintained. The Update was provided as a handout at numerous presentations, workshops, and exhibits this fiscal year. The Update also served as a quick and valuable response to phone calls and letters regarding APH's computer products.

Work planned for FY 1990. Current plans call for updating and disseminating the newsletter semiannually and maintaining the database.

Microcomputer Applications

Products

APH PocketBraille (continuing)

Purpose: To develop a portable note-taking device

Project staff: Larry Skutchan, Project Director
Jeff Wheatley, Programmer
Fred Otto, Project Assistant
Jim Robinson, Manufacturing Specialist

Background. The Kentucky Department for the Blind developed the PocketBraille and PortaBraille. Each is a complete portable note-taking system with braille keyboard, parallel and serial ports, and a speech synthesizer. The PortaBraille additionally contains a braille display. Each contains firmware that makes writing and editing possible. With the approval of the Educational Research and Development Committee, APH began designing a version of this system. It is called the APH Pocketbraille. The APH PocketBraille was first marketed in June 1988.

Work during FY 1989. Enhancements to the firmware were installed to provide bug fixes, improved speech quality and responsiveness, and to compensate for differences in a new microprocessor that was substituted for the original version which is no longer available in the United States. Preliminary design specifications were developed to provide the PocketBraille with more simple editing functions and a file management system. The anticipated code changes for the new version of the Screen Door for the Apple will be postponed until FY 1990 due to delays in the manufacturing of the board. Likewise, code installation to support the Screen Door for the IBM has been postponed until further development of the Apple version. The manual has been rewritten to provide a more tutorial-like style that presents information a little at a time. It moves less used topics to later in the book.

Work planned for 1990. The enhancements to both versions of the Screen Door should be completed in FY 1990. The work begun on the editor and file system should also be completed. The PocketBraille's new manual will be reviewed, edited, and turned over to production.

APH Scientific Calculator: for the Apple II Computer (formerly entitled Number Cruncher (continuing)

Purpose: To produce a talking calculator program

Project staff: Larry Skutchan, Systems Programmer

Background. Members of both the Third and Fourth Microcomputer Advisory Committee Meetings noted the need for a sophisticated, inexpensive calculator program. Such a program was discovered on the CompuServe network, the author was contacted, and permission to adapt the program was obtained. It was called Number Cruncher. Production approval for this product has been obtained.

Work during FY 1989. Final program changes were implemented, and problems associated with the name of the product were resolved by renaming it APH Scientific Calculator: for the Apple II Computer. The package was turned over to production.

Work planned for FY 1990. The Number Cruncher project is complete. Future enhancements will be dictated by responses from the field.

BASIC Programming (new)--replaces Sunburst's Meet the Computer--Beginning Topics and Meet the Computer--Intermediate BASIC (discontinued)

Purpose: To adapt these sets of materials for use by visually handicapped students or clients who need to learn BASIC programming

Project staff: Debbie Willis, Project Director
Cathy Talbott, Project Assistant
Rob Meredith, Programmer

Background. Members of the Fourth Microcomputer Advisory Committee Meeting assigned a high priority status to reviewing Sunburst's BASIC programming series for possible adaptation for use by visually handicapped persons. These include Meet the Computer--Beginning Topics and Meet the Computer--Intermediate BASIC. Both levels of the series were reviewed and found to be an excellent set of materials. Adapting these sets of materials was given high priority at the Fifth Microcomputer Advisory Committee Meeting. Because of the workload, however, it was decided to delay work on this project until the next fiscal year.

Work during FY 1989. Members of the Sixth Microcomputer Advisory Committee decided that what was actually needed was a supplement of 10-15 simple generic programs to accompany an introduction to programming class. This supplement should include programs that have some meaning for visually handicapped learners. This project on BASIC programming was substituted for the adaptation of Sunburst's programming series.

In preparing to design this revised product, a textbook and software program analysis was conducted to determine a procedure for teaching BASIC programming. In this analysis, six textbooks and three programs were analyzed and the main concepts taught were listed. This list was then given to a few teachers for review. The teachers were asked to number the concepts in the order in which they would recommend teaching them. The results were combined and suggestions were documented for a BASIC programming disk.

Work planned for FY 1990. A plan of what concepts should be covered and the order of presentation will be specified. It will also be determined what each of the 10-15 programs should do. The supplement and the programs will be written. These materials will be reviewed by in-house staff, revised, and then sent out for evaluation. After necessary modifications and a final in-house review have been done, the product will be turned over to production.

Manuals (continuing)

Purpose: To provide manuals in braille, large type, recorded, or disk form to support use of commonly used microcomputer equipment and programs

Project staff:
Debbie Willis, Project Director
Larry Skutchan, Systems Programmer
Fred Otto, Project Assistant

Background. At the Fourth Microcomputer Advisory Committee Meeting, it was recommended that APH continue to provide manuals deemed important in a medium usable by visually handicapped persons. In April 1986, Apple offered to supply APH the ASCII text files of Apple manuals for editing and dissemination by APH. The significance of this gesture resides in the fact that an individual possessing the ASCII text file of any work has the ability to output that information in hardcopy regular print, large print, or braille; refreshable braille; or synthetic speech.

Production approval was obtained for the Apple IIGS Owner's Guide and its ASCII text files were received from Apple. An edited version of the disk edition, with additional changes specified by Apple's editors, was approved by Apple. Although the idea of a manual reading program did not receive top priority at the Fifth Microcomputer Advisory Committee Meeting, it was decided to write a beginning level program for ease of reading text provided on disks.

Work during FY 1989. Changes, as specified by Apple, were included in the disk version of the Apple IIGS Owner's Guide. The text files of the IIGS Owner's Guide were broken down by topics into small files and grouped in subdirectories for easy access by the manual reading program. The disk also contains the complete manual in one large file for those who wish to print it out in its entirety and an introduction in braille and large type. The disk version with its hardcopy introduction, was reviewed by in-house staff.

After lengthy consideration of the implications of allowing manuals on disk to be provided, Apple's Legal Department formalized their Software Licensing Agreement for disk manuals and granted APH permission to publish Apple manuals on disk. APH will have first choice of which of Apple's manuals to publish on disk.

Apple sent text files of the Apple IIc+ Owner's Guide with permission to produce it on disks as well. APH also received permission from Addison-Wesley to produce Applesoft BASIC Programmer's Reference, BASIC Programming with ProDOS, and the Apple IIe Technical Reference on disk. Since Apple no longer holds the rights to APPLEWORKS, permission to produce the Appleworks Reference Manual and Appleworks Tutorial on disks is being sought from Claris Corporation.

APH personnel met with an IBM representative to discuss the need for disk versions of IBM manuals. It appears that IBM is interested in working in that direction. IBM manuals can currently be accessed through an on-line communications system called "Book Manager." The user, however, pays a fee comparable to the cost of the printed manual plus the on-line cost.

Work planned for FY 1990. After the final review of the disk version of the Apple IIGS Owner's Guide, the ASCII text edition of the manual with an introduction provided in braille and large type will be turned over to production. Assuming permission is granted by Claris Corporation, top priority will then be to edit and produce the Appleworks Reference Manual and Appleworks Tutorial in the same manner as the Apple IIGS Owner's Guide. The other manuals APH has permission to provide on disk will be discussed and prioritized at the next Microcomputer Advisory Committee Meeting in the Fall. Other manuals will be considered for production as demand warrants. The release of talking software for the Macintosh makes Macintosh manuals worth consideration.

MECC Software (continuing)

Purpose: To adapt widely used educational software distributed by the Minnesota Educational Computing Corporation (MECC)

Project staff: Debbie Willis, Project Director
Jeff Wheatley, Programmer
Larry Skutchan, Systems Programmer
Cathy Talbott, Project Assistant

Background. Participants in the Second, Third, Fourth, Fifth, and Sixth Microcomputer Advisory Committee Meetings and members of the Educational Research and Development Committee at APH's 1986 Interim Meeting and 1988 Annual Meeting assigned high-priority status to the development of speech-adapted software from MECC. This challenge is particularly noteworthy because MECC materials are developed by educators and include a vast collection of titles already available to thousands of school systems nationwide.

General approval for production of speech accessible adaptations of the MECC software was granted with the following priorities: 1. mathematics, 2. science and simple logic, and 3. English, social studies, and writing.

After completing the talking version of Elementary Volume 1--Mathematics, permission was sought and received from MECC to modify three additional selections. They are Food Facts, Elementary Volume 5--Language Arts (Prefixes), and Social Studies Volume 1.

Work during FY 1989. Final modifications were made to the talking version of Food Facts. The supplement, to accompany the talking disk and original MECC manual, was completed. After consultants evaluated Food Facts, and a final in-house review was conducted, the modified version was submitted to MECC for final approval and then turned over to production. This program is now available.

Elementary Volume 5--Language Arts (Prefixes) was completely reworked in order to operate more quickly, to keep student records, and to set up each file so that the teacher will eventually be able to alter the files in any way desired. [This feature is built in, but not currently usable.] The puzzles on the disk were also improved and the question/answer choices were randomized to provide greater use of the program for each student. The program was reviewed several times in-house and by outside consultants. Many "bugs" in the program needed to be worked out before the final version worked appropriately.

The supplement, to accompany the talking version of Prefixes (which includes talking versions of the original Prefixes print worksheets) and the original MECC manual, was rewritten for the revised program. The word lists used in the Prefixes program were included in the supplement in large type and braille so that the blind students' activity would not be made more difficult by becoming a spelling problem in addition to the task presented. The supplement discussing the changes and new operational features of the program was reviewed and edited.

The final draft of Elementary Volume 5--Language Arts (Prefixes) was sent out for evaluation. Several suggested changes were made by the consultants.

Following an in-house review of Social Studies Volume 1, it was decided that the program would not be useful to teachers unless more background information for using each program on the disk was provided. A social studies teacher who worked on the original MECC version was contacted regarding writing the necessary background information for each unit and the student worksheets necessary to the unit. Mr. Loren Dunham provided suggestions for improving the current documentation by including an enhanced INSTRUCTIONAL DESIGN MODEL. Mr. Dunham developed the necessary background information for one of the programs, USPOP, on the Social Studies Volume 1 disk as a prototype.

MECC was contacted regarding obtaining permission to adapt three more of their programs, Writing A Narrative, Oregon Trail, and Word Munchers. At the time of this writing, permission had not been received.

Work planned for FY 1990. After the final in-house review of Elementary Volume 5--Language Arts (Prefixes) is completed and MECC's approval of the finished modified product is received, the program materials will be turned over to production. APH intends to contract with Loren Dunham to prepare the background information necessary to make the programs on the Social Studies Volume 1 disk useful to teachers and their visually handicapped students. After this information is available, the remainder of the supplement to accompany the talking version of this program and the original MECC manual will be drafted. The programs on the disk will then be further modified as needed. These materials will be reviewed in-house, revised, and sent out for evaluation. After final modifications have been made, the program will have a final in-house review, be sent to MECC for approval of the modified version, and be turned over to production.

If permission to adapt one or more of the MECC selections last requested is not received, additional MECC programs will be reviewed for possible adaptation.

SEI Software (continuing)

Purpose: To adapt educationally sound, commercially available software for use by visually handicapped persons

Project staff: Debbie Willis, Project Director
Larry Skutchan, Systems Programmer
Fred Otto, Project Assistant

Background. At the Second Microcomputer Advisory Committee Meeting, a modified version of Sliwa Enterprises, Inc. (SEI) educational software series was given high priority. The content of each SEI program is appropriate for high school and college students as well as adults. APH was able to make an arrangement with SEI for a customized edition of 33 of these programs. Production approval for this series has been received.

Before going to production, each disk was thoroughly checked for any factual or grammatical type errors; a camera-ready introductory page, title page, and reference guides were prepared to accompany the large type manual for each program. The same materials were also prepared for braille. SEI complied with APH request that an updated version of TEXTALKER be used on its disks to make the programs compatible with the Apple IIGS. Prior to FY 1989, 20 programs were turned over to production.

Work during FY 1989. Adaptation was completed on the other 13 programs and they were submitted for production. Project staff worked with production personnel as needed on manufacturing the programs. All 33 APH/SEI talking software programs are available from APH. Sales of the programs are being monitored.

Work planned for FY 1990. No further development is planned regarding the SEI programs. Sales of the programs will continue to be monitored to determine the need for any further activity.

Speaqualizer (continuing)

Purpose: To produce a speech synthesis system for IBMs

Project staff: Larry Skutchan, Systems Programmer
Jeff Wheatley, Programmer
Jim Robinson, Manufacturing Specialist

Background. The Speaqualizer is a hardware based access package for the IBM computer. It permits the blind user to use speech to examine text displayed on the screen.

Speaqualizer was developed by the Research Committee of the National Federation of the Blind. After obtaining production approval from the Educational Research and Development Committee, APH research staff members began working with the National Federation of the Blind to continue development of the device's firmware. It became available from APH in July 1987.

Work during FY 1989. Speaqualizer received several significant improvements including commands to completely turn off the speech for use by sighted people, additional information such as the color of a character and its background, and the ability to use the PAGE UP and PAGE DOWN keys on the IBM keyboard to read the entire screen. Of particular interest to word processor users, Speaqualizer also received the ability to read text word-by-word when using the IBM's LEFT ARROW and RIGHT ARROW keys when the cursor moves more than one character horizontally. In addition, code was installed to let the user set DIP switches on the Speaqualizer circuit board to tell Speaqualizer about specific hardware configurations and setting preferences.

Adaptations were made to the circuit board to allow Speaqualizer to work with the newer, faster machines. Attempts to make Speaqualizer function properly on the Model 25 and 30 were determined to be unpractical in terms of user installation. It was found, however, that Speaqualizer already works with the Model 30/286.

Problems cropped up with the version for the PS/2 models with the micro channel bus architecture. Test equipment has been approved for use in solving these problems.

Work planned for FY 1990. The version of Speaqualizer for computers using the micro channel bus will be completed. Software enhancements will continue to improve Speaqualizer's usefulness. A Spanish version of this system may also be developed. APH also continues the search for improved speech quality at low cost to the user.

Talking Literacy Kit (TALK): Apple II Computers (continuing)

Purpose: To provide an introductory set of speech-accessible computer software and related materials for any of the current Apple II family of computers which could be easily integrated into existing programs of computer literacy or introduction to computers for legally blind youth through adult beginners

Project staff: Debbie Willis, Project Director
Jeff Wheatley, Programmer
Larry Skutchan, Systems Programmer
Cathy Talbott, Project Assistant

Background. During the fall and winter of 1985, the Talking Apple Literacy Kit (TALK): //e Edition was in the production pipeline of APH. The product became available in September 1986. First run sales were most encouraging. Subsequent runs of the kit were initiated and sales remained brisk. In response to requests from the field, APH offered sets of the Brailled Keyboard model for the Apple //e, a component of the TALK, as a separate item. The name of the kit and other components were changed in 1987 in order to be in compliance with the legal guidelines of Apple Computer, Inc.

At the Fifth Microcomputer Advisory Committee Meeting, a revision of the kit to include all current Apple II computers received high priority. Work on two components of the revised kit, the Brailled Keyboard Overlay for the Apple IIGS(R) and the disk introducing the keyboard, word processing, and games was started.

Work during FY 1989. Work on the disk was continued. The introductory word processing program, introductory games, and keyboard practice were programmed for speech and large print output to the screen. The program was named LetterTALK+. Documentation to accompany the disk was drafted. The program was reviewed in-house several times and underwent many changes.

Work on the Brailled Keyboard Overlay for the Apple IIGS also continued. Prototypes of the overlay were developed, checked for accuracy, tested for legibility, and a brief supplement to accompany the product was written. After some revisions, the materials were completed and turned over to production. It was decided to offer LetterTALK+ and the Braille Keyboard Overlay for the Apple IIGS as separate products from the kit. The overlays were produced and are being sold separately from the kit in packages of five.

Work planned for FY 1990. The documentation and reference sheets for the disk introducing the keyboard, word processing, and games will be completed. The disk and its accompanying documentation will be evaluated by consultants. After modifications to LetterTALK+ have been made, the materials will have a final in-house review and then be turned over to production.

The software disk entitled APH Presents the Talking Apple will be reworked to include features of the Apple IIGS, new features of TEXTALKER, and suggestions from the field. The manual will be updated and rewritten to include current information. The computer parts collection in the kit will be reviewed and updated. Components will be added, deleted, or changed as needed.

The final revised kit will be evaluated by at least two consultants. After final revisions and a final in-house review, the Talking Literacy Kit (TALK) for Apple II Computers will be turned over to production.

Talking Typer (continuing)

Purpose: To provide students/clients and teachers with appropriate software and documentation for use in teaching and learning typing skills with computers

Project staff:
Debbie Willis, Project Director
Larry Skutchan, Systems Programmer
Rob Meredith, Programmer
Fred Otto, Project Assistant

Background. At the Second Microcomputer Advisory Committee Meeting, a typing program called Kids Can! Typer, developed by Ted Hasselbring and Carol Hamlett for sighted special education students, was demonstrated and discussed. The advisory group gave a speech-adapted version of this program a high priority. APH acquired complete marketing rights to the speech-adapted version and contracted with Carol Hamlett to make the necessary programming changes. Production approval was requested and received for this product.

An initial version of the adapted program (teacher disk, student disk, and documentation) was completed. The three components were thoroughly reviewed by in-house staff and several major "bugs" were found. A review of the entire program with suggestions for changes was sent to Carol Hamlett. While initial plans had not included adding speech to the teacher disk, Miss Hamlett reprogrammed that disk to make all the essential information being presented to the screen talk. A revised version was sent to APH. A preliminary review indicated there were still too many problems in the program's operation to send it out for formal evaluation and the manual was difficult to follow. Therefore, more revisions were required.

Work during FY 1989. All known bugs were eliminated, several speech oriented enhancements (including complete speech support for the editor) were installed, and the documentation was appropriately revised. After numerous in-house reviews and changes, a final draft of the entire Talking Typer program was sent out for evaluation by consultants.

Work planned for FY 1990. The Talking Typer program will be completed. Future enhancements will be dictated by responses from users.

Telecommunications (new)

Purpose: To create a tutorial that introduces blind students, clients, and teachers to telecommunications; what it is, its wide array of uses, how to communicate via modem with other computers, how to access national services and bulletin boards

Project staff: Microcomputer Group

Background. At the Fifth and Sixth Microcomputer Advisory Committee Meetings the need for materials to introduce students and teachers to telecommunications was expressed. "Networking," "telecommunications," and "distance learning" have quickly become projects of great importance in the schools. There is little doubt that introductory materials in the area of telecommunications are needed.

Work during FY 1989. Several introductions to telecommunications and simulations of bulletin boards were found and reviewed. Introduction to telecommunication classes for visually handicapped students were observed and taught.

Work planned for FY 1990. A set of materials to introduce students, clients, and teachers to telecommunications will be further researched and designed. Development of this product will begin this fiscal year.

TEXTALKER (continuing)

Purpose: To incorporate features specifically recommended by blind users into the TEXTALKER software and to set standards for use of speech synthesis on the Apple II

Project Staff: Larry Skutchan, Systems Programmer
Rob Meredith, Programmer

Background. TEXTALKER is the software that works with the Echo synthesizers to provide the Apple with synthesized speech. It was written by Street Electronics Corporation. Members at the Third Microcomputer Advisory Committee Meeting recommended the program be modified to more accurately reflect the needs of the blind user and to help set standards for talking software. The research staff gathered information from several sources including a survey conducted by Bob Glass, the suggestion files at Street Electronics, comments from end users, and observations of users in the field. With the cooperation of Street Electronics, several improvements were added to the system that both enhanced productivity and increased ease of use. One of these features, the ability to silence any text with any keystroke, has become a standard not only on the Apple, but in many IBM screen access packages. (APH's own Speaqualizer supports this feature.) APH's initial version of TEXTALKER was released as version 3.1.1. Later, with the introduction of the Apple IIGS, TEXTALKER received changes that permitted it to function at the new computer's higher processing speeds. This and enhancements that enabled the user to define columns for reviewing purposes were installed and the program was released as version 3.1.2.

Work during FY 1989. As the microcomputer group observes end users and notes suggestions on user survey cards, enhancements are designed and installed. Some of the more significant features added during this year include the addition of phonetic pronunciation of letters when desired, a new "quick silence" feature that stops the speech until the next carriage return, and several performance improvements. The microcomputer group has also begun making a version of TEXTALKER that takes advantage of some of the advanced hardware features of the Apple IIGS to provide greater access to more off-the shelf software packages and some of the built-in software on the IIGS.

Worked planned for FY 1990. The microcomputer group will focus its TEXTALKER efforts on greater accessibility to off-the-shelf software by taking advantage of some of the advanced hardware features of the Apple IIGS.

Utilities Disk (continuing)

Purpose: To produce a utilities disk

Project staff: Larry Skutchan, Systems Programmer

Background. Participants of the Third Microcomputer Advisory Committee Meeting recommended that APH produce disks of most often needed utility programs that functioned with speech. This would allow the teacher and student to perform all the most needed disk maintenance operations with dependable talking software which would be available from one place. Such a disk was approved for production.

The research staff obtained the source code to two of the utility programs from Apple Computer, Inc. and began modifying them.

Work during FY 1989. The ProDOS version of the utilities package received some minor enhancements that included the correction of a problem involving the FILER program when used on an Apple IIGS to copy DOS 3.3 disks, the installation of code that made the CONVERT program check if ProDOS quit code was installed, and if it was, to use that when leaving the program, and the addition of support for the SlotBuster synthesizer. The DOS 3.3 version of the utilities disk was completed and turned over to production.

Work planned for FY 1990. The utilities project is complete. Future enhancements will be dictated by responses and suggestions from the field.

The World Book Encyclopedia, Disk or CD-ROM Edition (continuing)

Purpose: To provide a special edition of The World Book Encyclopedia which would be accessed via technology

Project staff: Larry Skutchan, Project Director

Background. APH has produced two special editions of The World Book Encyclopedia. The first was a braille edition of the 1959 reference work and the second was a recorded edition based on the 1978 and 1979 editions. Updated information was provided for the latter through provision of three supplements; The World Book Year Books for 1980 and 1981, 1982 and 1983, and 1984 and 1985. Due to the age of the main reference work, a decision was made not to produce any subsequent combined yearbooks. However, visually handicapped students need access to a major reference work such as this encyclopedia, which is the most widely used encyclopedia for educational purposes.

APH met with World Book personnel and learned that World Book is still interested in working with APH and that the text is available in electronic form.

Work during FY 1989. APH received the text in electronic format and obtained equipment to read. Investigation was initiated into the feasibility of developing retrieval software to run on the Apple II line of computers.

Work planned for FY 1990. Investigation and development will continue in two areas. First, software will be developed or adapted to quickly retrieve information from the text, and a determination will be made on the most appropriate media on which to offer the electronic edition. CD-ROM and floppy disk editions are under consideration.

Other Activities

Academic and Test Needs Survey (continuing)

Purposes: To (a) identify specific academic materials needed in the areas of language arts, mathematics, science, and social studies; (b) to identify specific academic measures needed; and (c) to determine the sources of funds used for the purchase of special educational materials for visually handicapped students

Project staff: Bill Duckworth, Project Director
Karen Poppe, Project Assistant

Background. At its May 1987 meeting, APH's Educational Research and Development Committee recommended, "That the Department of Educational Research again survey the field to see if there are emerging needs in the science, mathematics, and social studies areas." At the same time, plans had been made to conduct a survey of test needs. These surveys were combined and expanded slightly in scope.

A survey form addressing the above listed purposes was developed and sent, in the spring of 1988, to 31 instructional resource centers and 7 selected residential schools for the blind offering academic programs. For each of the academic areas queried, responses were in the form of specific texts and other teaching materials needed, as categorized by educational level (i.e., preschool/readiness, primary, elementary, middle school, and high school). Results indicated needs for a wide array of textbooks with little consensus between responding agencies/institutions. This information will be used by APH's Editorial Department in developing recommendations for texts to be produced by APH in braille and large type.

Work during FY 1989. The report on this survey has to be finalized.

Work planned for FY 1990. The report will be completed.

Feasibility of Conducting a National Study of Academic Achievement

Purpose: To determine the feasibility of implementing such a study

Project staff: June Morris, Project Codirector
Carson Nolan, Project Codirector

Background. Academic achievement of legally blind students has long been of interest to persons responsible for their education. In the early 1940s, Samuel P. Hayes reported on use of the Stanford Achievement Test with 600 blind students in grades 4-9. Results of his study showed achievement curves for all subject matter tests to closely follow those for the sighted norm group except in Arithmetic Computation where the blind students fell considerably below the sighted norms.

Much more recently (APH's October 1983 Annual Meeting), in response to widespread concern about the academic achievement of blind students, June Morris proposed using the then new Forms E and F of the Stanford Achievement Test to measure academic achievement on a national sample. To determine the feasibility of conducting such a study, 14 ex officio trustees were contacted and asked if it would be possible for them to participate in such a study by having their teachers administer the tests if APH were to identify a sample of students to be tested, provide the tests and their directions, score the tests, and provide test results for the students tested. The response was an overwhelming no. Reasons cited included teacher time required, student time required, infrequent contact with students in rural areas served by itinerant teachers, and that cooperation would be unpredictable (e.g., parental approval would be required and the ultimate decision often would be at the local level).

Subsequently, APH contacted a number of states to learn if it would be feasible to obtain and use information from minimum competency tests to identify trends. This too did not prove possible because complete data were not available from any state contacted.

The need for information about academic achievement was once again brought up at APH's October 1987 Annual Meeting when its Educational Research and Development Committee recommended plans be implemented to conduct a nationwide study of academic achievement using the new (Series 8) Stanford Achievement Test--Form J, during the 1989-90 school year.

Work during FY 1989. Carson Nolan and June Morris met with top level personnel from The Psychological Corporation, publisher of the Stanford Achievement Test, regarding how such a study might be done. Variables to be incorporated were identified to correspond with the norming sample and an experimental design was planned that would meet minimum requirements for validity and reliability. The cost for conducting this study was projected at between $1,000,000 and $2,000.000. The unanimous decision was that it was not economically feasible to undertake such a study. This information was reported at the Formal Meeting of Ex Officio Trustees held in October 1988.

Technical Research Division

Technical Research Division (previously APH's New Products Department)

Purpose: To develop products involving high-technology and to introduce other new products for production

Division staff: Bob Phelps, Manager
James Robinson, Manufacturing Specialist
Frank Hayden, Manufacturing Specialist
Darlene Donhoff, Technical/Clerical Assistant

Background. For many years APH personnel from its research and new products departments have worked closely together in the development of electronic and other technological products and in the process of transforming experimental prototypes of new products into manufactured goods. Because of this close relationship, in January 1989 an organizational change was made in which the New Products Department became the Technical Research Division of the Department of Educational and Technical Research (previously the Department of Educational Research).

Work during FY 1989. The following briefly describes projects addressed by this division:

APH Portable Plus Record Player; Making changes on amplifier and awaiting new samples. Waiting for samples of cases. Investigating the feasibility of manufacturing case in-house.

Speaqualizer; Completed "Turn Off" label, opened work orders for braille and large type Users Manuals. Translated 2.2 Update Addendum into braille. Large type and braille work orders opened for productions of Update Addendum. Work order opened for assembly and packing of Speaqualizer. Worked on writing up test procedures for manual and bill of materials for APH Management System. Issued stock transfer for the Speaqualizer Upgrade Kit to be pulled from stock so that it could be revised.

APH PocketBraille; First work order of 100 units completed and sent to shipping. Second work order of 100 units nearly completed. Working on drawings for assembly and packaging and completing manufacturing manual. Worked on a bill of materials for APH Management System.

*External Memory Module; Received all modules ordered (103 pieces in-house), completed work order for testing and packaging, and sent to shipping. Worked on a bill of materials for APH Management System.

*Screen Door for the Apple II; Still in development stages, there were some design problems which needed resolved.

*Screen Door for the IBM; Readied for tooling and production samples.

Talking Utilities for ProDOS and DOS 3.3; Completed ProDOS and sent to shipping on March 24, 1989. DOS 3.3; braille translation on disk, large type manuals completed, braille manual sent to production.

APH/SEI Talking Software Programs; Received all remaining disks, completed all work orders for final packing, and sent to shipping. Worked on a manual and bills of materials for APH Management System.

Playing the Crucial Role in Your Child's Development, VHS video cassette version; Completed work order for packaging and sent to shipping. Completed manual and bill of materials for APH Management System.

Handi-Cassette Carrying Case; Received a suitable sample and issued an order for manufacturing of cases. First shipment received in May.

Bright Sights; Washing instruction labels--checked with vendors for samples and prices. New injection-molded pegs--placed an order with vendor for tooling and samples which arrived in May.

Sensory Stimulation Kit; Worked up a bill of materials for the Sensory Stimulation Kit, which will be used in planning the final bills of material structure for APH Management System.

Work planned for FY 1990. Upcoming projects will include:

*Screen Door for the Apple II; will be continuing to work on this.

*Screen Door for the IBM; will be continuing to work on this.

*Refreshable Braille Display; Looking at 20-cell displays to work with Speaqualizer, APH PocketBraille, and possibly other products.

Speaqualizer Key-Pad Control Box; redesign.

Speaqualizer IBM PS2 Model 50; continue development.

APH Scientific Calculator: for the Apple II computer and other software; facilitate production.

AC/DC Rechargeable 4-track Cassette Tape Recorder/Player; Will be working in conjunction with Thompson Consumer Electronics on the redesign of the #5194 General Electric Tape Machine and to develop a handicap-lever for the General Electric Tape Player #5194.

APH PocketBraille; Preliminary planning to start redesigning.

Develop a mat and the electronics for an early childhood Sensory Mat.

Develop Repair Procedures for current Electronic Products:
APH PocketBraille, Speaqualizer, Echo Commander.

Continue working with APH Management System to bring up the manufacturing portion.

*for use with APH PocketBraille

Agencies Participating in Research

In addition to the agencies named here, appreciation is also extended to the many other agencies which cooperated with APH's research efforts by permitting members of their staffs to serve as consultants or respondents to requests for information.

Apple Computer, Inc.; Cupertino, California
Blind Babies Foundation; San Francisco, California
Carr School; Lincoln Park, Michigan
Central Pennsylvania Special Education Resource Center; Harrisburg, Pennsylvania
Children's Center for the Visually Impaired; Kansas City, Missouri
Colorado School for the Deaf and the Blind; Colorado Springs, Colorado
Coyle Avenue School; Carmichael, California
Davidson Engineering; Morristown, Tennessee
Detroit Public Schools Program for the Visually Handicapped; Detroit, Michigan
Division of Blind Services; Lafayette, Louisiana
Expert Systems Software, Inc.; Nashville, Tennessee
Florida School for the Deaf and the Blind; St. Augustine, Florida
Foundation for Blind Children; Scottsdale, Arizona
Foundation for the Junior Blind; Los Angeles, California
Glen Cove Elementary School; Vellejo, California
The Governor Morehead School; Raleigh, North Carolina
The Greater Pittsburg Guild for the Blind; Bridgeville, Pennsylvania
Illinois School for the Visually Impaired; Jacksonville, Illinois
Jefferson County Public Schools; Louisville, Kentucky
Johnson Elementary School; Denver, Colorado
Kansas State School for the Visually Handicapped; Kansas City, Kansas
Kentucky Department for the Blind; Frankfort, Kentucky
Kentucky Rehabilitation Center for the Blind; Louisville, Kentucky
Kentucky School for the Blind; Louisville, Kentucky
Lawton Elementary School; San Francisco, California
Los Angeles County Office of Education; Canyon County, California
Marina Middle School; San Francisco, California
Minnesota Educational Computing Corporation (MECC); St. Paul, Minnesota
National Federation of the Blind; Baltimore, Maryland
National Special Education Alliance; Cupertino, California
New Hampshire Educational Services for the Visually Handicapped; Concord, New Hampshire
New York Institute for Special Education; New York, New York
Overbrook Educational Center; Philadelphia, Pennsylvania
Overbrook School for the Blind; Philadelphia, Pennsylvania
Perkins School for the Blind; Watertown, Massachusetts
Pinellas County Schools; St. Petersburg, Florida
The Psychological Corporation; San Antonio, Texas
RC Systems; Bothell, Washington
St. Lucy's Day School; Philadelphia, Pennsylvania
Sensible Software; Troy, Michigan
Sliwa Enterprises, Inc.; Yorktown, Virginia
Street Electronics Corporation; Santa Barbara, California
Tennessee School for the Blind; Nashville, Tennessee
Valle Verde Elementary School; Walnut Creek, California
Visually Impaired Preschool Services; Louisville, Kentucky

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Publications

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Presentations and Workshops

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Caton, H. R., & Pester, E. J. (1988, October). Braille Reading. Discussion Group at Annual Meeting, American Printing House for the Blind, Louisville, KY.

Moore, S. B. (1988, August). APH materials for low vision students. Jefferson County Schools, Louisville, KY.

Moore, S. B. (1988, August). Techniques and materials for teachers of young blind and visually handicapped children. Ohio State School for the Blind, Columbus, Ohio.

Moore, S. B., & Caton, H. (1988, August). Workshop and discussion group: Materials for the young visually impaired student. International Conference on Preschool Blind Children, Edinburgh, Scotland.

Moore, S. B. (1989, March). APH materials for early childhood learners. California Transcribers and Educators of the Visually Handicapped, San Jose, CA.

Moore, S. B. (1989, April). APH educational materials for young and multi-handicapped visually impaired learners. Workshop at APH for Ohio State University, Columbus, OH.

Moore, S. B. (1989, June). Educational materials for young visually impaired students. University of Louisville, Louisville, KY.

Moore, S. B. (1989, June). Techniques and methods for working with infant and preschool visually handicapped students. University of Louisville, Louisville, KY.

Moore, S. B., & Chen, D. (1989, June). Procedures and materials for young visually handicapped children. Seminar in Special Education, American Printing House for the Blind and the University of Louisville, Louisville, KY.

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Pester, E. P. (1988, November). "Teaching Braille." Session during the course, *Educational Procedures for Blind Children*, University of Louisville, Louisville, KY.

Pester, E. P. (1989, March). *Teaching Braille Reading.* A 2-day workshop at the Louisiana School for the Visually Impaired, Baton Rouge, LA.

Pester, E. P. (1989, June). Braille Instruction for Adults." Session during Seminar in Special Education, *Teaching Rehabilitation Success/Visually Impaired*, American Printing House for the Blind, Louisville, KY.

Pester, E. P. (1989, June). "Braille Readiness." Session during Seminar in Special Education, *Procedures and Materials for Young Visually Handicapped Children*, American Printing House for the Blind, Louisville, KY.

Skutchan, L. (1988, October). *Meeting the Needs for Computer Equipment through Hardware Adaptation and Development*, Annual Meeting, American Printing House for the Blind, Louisville, KY.

Skutchan, L., & Otto, F. (1988, July). *Complete Speech Access for the Apple and IBM*, AER Conference, Montreal, Quebec.

Willis, D. H. (1988, October). *Addressing the need for a variety of talking software.* Annual Meeting, American Printing House for the Blind, Louisville, KY.

Willis, D. H. (1988, October). *Computer Applications.* Discussion Group at Annual Meeting, American Printing House for the Blind, Louisville, KY.

Willis, D. H. (1989, June). "Computer Products and Resources." Session during Seminar in Special Education, *Teaching Rehabilitation Success/Visually Impaired*, American Printing House for the Blind, Louisville, KY.

New Products

Microcomputer Related Products

Hardware

Cassette Tape Interface Device (APH PocketBraille accessory)
External Memory Module (APH PocketBraille accessory)
6-foot Parallel Printer Output Cable (APH PocketBraille accessory)
Speaqualizer Upgrade Kit

Computer Literacy

Braille Keyboard Overlay for the Apple II_{GS}

Educational Software

MECC: Food Facts
SEI: Afro-American Literature
SEI: American History 2
SEI: American History 3
SEI: American History 4
SEI: American Poetry
SEI: Ancient Civilization
SEI: Asian/African History
SEI: Dickens
SEI: Early American Literature
SEI: Edgar Allen Poe
SEI: European History 1
SEI: European History 2
SEI: Fantasy
SEI: High School Literature 1
SEI: High School Literature 2
SEI: High School Literature 3
SEI: History of Space Flight
SEI: Mark Twain
SEI: Modern British Literature
SEI: Mystery
SEI: Mythology
SEI: Science Fiction
SEI: Sentence Completion
SEI: Shakespeare 1
SEI: Shakespeare 2
SEI: Short Story
SEI: Steinbeck/Faulkner/Hemingway
SEI: United Nations and Foreign Governments
SEI: Woman Authors
Teacher's Pet

Educational Aid and Tools

Handi-Cassette Carrying Case

Braille/Tactile Materials

Brigance Diagnostic Comprehensive Inventory of Basic Skills (Green): APH Tactile Supplement
Patterns Prebraille Program

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